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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/751,898	01/07/2004	Shosuke Endoh	247409US2	3795

22850	7590	06/18/2007
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.		
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ALEXANDRIA, VA 22314		

EXAMINER	
MACARTHUR, SYLVIA	

ART UNIT	PAPER NUMBER
1763	

NOTIFICATION DATE	DELIVERY MODE
06/18/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/751,898	Applicant(s) ENDOH ET AL.	
	Examiner Sylvia R. MacArthur	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14-19 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-19 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/23/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/23/2007 has been entered.

Response to Arguments

2. Applicant's arguments filed 4/23/2007 have been fully considered but they are moot considering the amendment to claims 1 and 14 wherein the substrate to be processed is mounted on the electrostatic chuck, a *whole upper surface* of the lower ring body is placed below the periphery of the substrate to be processed and an inner circumference of the ring member. Likewise, the amendment to claim 12 wherein the electrostatic chuck is located below the substrate to be processed and the ring member necessitated new search and consideration. Fig.5 of Ma (US 6,554,954) anticipates these amendments. The rejections using Koshiishi et al are withdrawn in view of the amendments to claims 1, 12, and 14.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claim 1 recites that the susceptor is made of a conductive material,

Art Unit: 1763

but applicant fails to specify if the material is electrically and/or thermally conductive. Page 11 lines 9-13 recites that the susceptor is made of aluminum a metal which is both electrically and thermally conductive.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 5, 6, 8, 10-12, 14, 16, 17, and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma et al (US 6,554,954).

Ma et al teaches a conductive collar surrounding a semiconductor workpiece in a plasma chamber. Refer to Fig. 5.

Regarding claims 1, 12, 14: The apparatus comprises a plasma processing chamber (abstract), a (metal is both electrically and thermally conductive, see col. 3 lines 1-5) susceptor 22, an electrostatic chuck 26 a ring member 58 also believed to be element 56, and a lower ring body 48.

Regarding claims 5, 6, 8, 16, 17: The claims depend upon the substrate regarding the material of construction, impedance, and thickness. Note that the invention is held to an apparatus which is what it is and not what it does, such that the substrate is not included in the apparatus, and the apparatus of Ma et al is inherently capable of constructing a ring member relative to the substrate as recited. Note that the inclusion of material or article worked upon by a

Art Unit: 1763

structure being claimed does not impart patentability to the claims. In re Young, 75 F. 2d, 25 USPQ 69.

Regarding claims 10 and 19: The susceptor 22 comprises a conductive lower electrode according to col.2 lines 49-59. How the ring member 58 is formed is a product by process limitation and does not structurally limit the ring member of Ma et al.

Regarding claim 11: The lower ring body 48 of Ma et al could inherently perform the function of protecting the susceptor. The use of the lower ring body does not structurally limit the apparatus.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-4, 7, 15, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al.

Claims 2-4, and 15: The dimensions of the ring especially the thickness is related to the impedance according to the specification page 14 of the present invention.

The dimensions of the components of the plasma chamber especially the ring members and lower ring members are a matter of optimization. The thickness of the ring members and lower ring members affect the transport of plasma around the substrate and the amount of

Art Unit: 1763

protection provided to the substrate edge. It is well settled in that the determination of optimum values of cause effective variables such as the dimensions of the ring and lower ring member is within the skill of one practicing in the art. In re Boesch, 205 USPQ 215 (CCPA 1980). Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to design the lower ring and the ring member to provide optimal thickness that would result in the optimal impedance to produce the optimal amount of plasma to process the wafer.

Regarding claim 7: The substrate is not part of the apparatus and is seen as a matter of an intended use. Note that the inclusion of material or article worked upon by a structure being claimed does not impart patentability to the claims. In re Young, 75 F. 2d, 25 USPQ 69.

Furthermore the prior art of Ma et al fails to teach the thickness of the substrate as being related to the impedance. The motivation to provide the dimensions of Ma et al or Koshihi et al within the ranges of claims 5-8 is to provide the optimal physical parameters of protection to the wafer for processing and provide the desired impedance. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the dimensions of the ring member within the ranges of claims 5-8a and 20 as a matter of optimization.

Regarding claim 21: Ma Fig. 5 fails to illustrate or teach that the entire upper surface of the susceptor is covered with the electrostatic chuck. Ma teaches in col.2 lines 60-67 that the electrostatic chuck 26 serves to securely hold the workpiece against the front surface of the pedestal (susceptor). Ma illustrates that a majority of the face of the upper surface of the susceptor is covered by the chuck. It is the examiner's position that the motivation to design the susceptor/chuck such that the chuck covers the susceptor's entire upper surface in order to ensure that the workpiece is secured along its entire length and such designing is a matter of

Art Unit: 1763

optimization. Thus, it would have been obvious for one ordinary skill in the art at the time of the claimed invention to ensure that the workpiece is amply secured onto the susceptor via the chuck.

9. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al in view of Tong et al (US 2004/0083975).

The teachings of Ma et al were discussed above.

Ma et al fails to teach the materials of construction as discussed in claims 9 and 18 of the claimed invention.

Tong et al teaches a hot edge ring 108 surrounding an electrostatic chuck wherein the chuck is made of such materials as SiC and silicon.

Tong et al teaches that the material of construction of the edge ring the degree of coupling through the plasma can be tailored to provide a desired localized "edge" etch rate at the outer portion of the substrate being processed, see [0026 of Tong et al].

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the ring of Ma et al with the materials disclosed by Tong et al.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fig. 2A of Dhindsa et al (US 6,824,627)

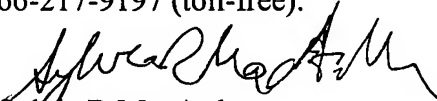
Figs. 5 and 6 of Ke et al (US 6,689,249)

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438.

Art Unit: 1763

The examiner can normally be reached on M-Th during the hours of 8 a.m. and 4:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sylvia R MacArthur
Primary Examiner
Art Unit 1763

June 11, 2007